

AMENDMENTS TO THE SPECIFICATION

The following paragraphs in the specification have been amended as follows:

[0016] Referring now to FIG. 2, a free wheeling turbine engine is illustrated. The free wheeling turbine engine is designated generally by the reference numeral 200. The free wheeling turbine engine 200 includes diesel and cylinders 201, turbocompressor starter 202, compressor 203, turbine 204, igniter and flame control 205, combustion chamber 206, exhaust manifold 207, fuel pump 208, regulator 209, by-pass ~~211~~ 210 , and preheating system ~~212~~ 211 . The power output of a diesel engine can be increased using the Hyperbar diesel concept where the conventional turbo-charger is effectively replaced by a free wheeling turbine engine. The freewheeling turbine engine can add energy to the diesel engine exhaust gases to allow higher boost pressures without excessive pumping losses. A bypass valve is used to operate the turbine separately to start the diesel engine. The diesel and turbine engines operate fuel lean to control polluting exhaust emissions.

[0032] Referring now to FIG. 5, another embodiment of a combustion method and system is illustrated with a turbine engine supercharger combined with a reciprocating SI or CI engine. This embodiment is designated generally by the reference numeral 500. The piston engine 501 includes a piston 503 in a piston chamber 504 driven by a piston rod 505. The exhaust gases 506 from the piston engine are provided to the turbine engine 502. The turbine engine 502 includes a turbine ~~507~~ 515 and an air intake 508. The exhaust gases 506 from the turbine ~~507~~ 515 are used to compress the air before it goes into the piston engine 501. Fuel rich exhaust 514 is directed into combustion chamber 513. The exhaust gases

506 are directed through an intercooler 511 that includes cooling tubes 512 with water 509 directed to the cooling tubes and a water outlet 510. Turbo-charging increases the operating pressure and mass flow in the engine resulting in higher power for a specific engine volume. Turbo charging is not usually done in a spark ignition engine because engine knock occurs with increased pressure and density. Turbo-charging is frequently done with compression ignition or diesel engines to increase performance. Although turbo-charging can increase engine performance, it does not reduce pollution in the exhaust gases.

[0045] Referring now to FIG. 6, another embodiment of a combustion method and system is illustrated with a turbine engine supercharger combined with a reciprocating SI or CI engine. This embodiment is designated generally by the reference numeral 600. The piston engine 601 includes a piston 603 in a piston chamber 604 driven by a piston rod 605. The exhaust gases 606 from the piston engine are provided to the turbine engine 602. The turbine engine 602 includes a turbine 607 and an air intake 608. The exhaust gases 606 from the turbine 607 are used to compress the air before it goes into the piston engine 601. Fuel rich exhaust 614 is directed into combustion chamber 613. The compressed air directed is through an intercooler 611 that includes cooling tubes 612 with water 609 directed to the cooling tubes and a water outlet 610. Referring to FIG, 6 a bypass valve is placed in front of the piston engine. During start up the valve is closed and the piston engine is bypassed. A starter to the turbine engine is turned on to turn the compressor that compresses air that flows to the turbine combustion chamber. The fuel injector injects fuel into the turbine combustion chamber and the igniter is turned on to combust the fuel and air. Once the turbine is operating to the appropriate level, the piston engine bypass valve is opened to start the piston engine. Air separation units with air coolers can be used to

supply nitrogen-enriched air to either or both the piston and turbine engines. The bypass valve can be adjusted to divert extra air to the turbine engine where fuel is injected to assist faster acceleration. A fuel injector 615 adds fuel to the fuel rich exhaust. An igniter/flame control unit 616 maintains the ignition in the combustion chamber 613. The exhaust has low NO₂, HCl, CO. An intercooler 619 and air separation unit 618 is connected to the turbine engine 602. A turbine engine starter ~~620~~ 621 is connected to the turbine engine 602.